

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (currently amended) A method of amplifying a 5kb or longer subsequence of a target nucleic acid in an aqueous solution using a polymerase chain reaction, the method comprising:

(i) contacting the target nucleic acid with a polymerase comprising a sequence-non-specific double-stranded nucleic-acid-binding domain that comprises an amino acid sequence that has at least 75% identity to the amino acid sequence of SEQ ID NO:2 joined to a polymerase domain with error-correcting activity, where the sequence non-specific double-stranded nucleic-acid-binding domain enhances the processivity of the polymerase domain compared to an identical polymerase domain not having the sequence non-specific double-stranded nucleic acid binding domain; ~~and~~; and

wherein the solution is of a composition that permits the sequence non-specific double-stranded nucleic acid binding domain to bind to the target nucleic acid and the polymerase domain to extend a primer that is hybridized to the target nucleic acid sequence to a length of 5 kb or longer;

(ii) incubating the solution using a polymerase chain reaction temperature profile that amplifies the 5 kb or longer subsequence.

2. (previously presented) A method of claim 1, wherein the polymerase domain has thermally stable polymerase activity.

3. (previously presented) A method of claim 1, wherein the polymerase domain comprises a *Pyrococcus* polymerase domain.

4. (cancelled)

5. (previously presented) A method of claim 1 wherein the sequence-non-specific double-stranded nucleic-acid-binding domain has at least 85% identity to SEQ ID NO:2

6. (previously presented) A method of claim 1 wherein the sequence-non-specific double-stranded nucleic-acid-binding domain has at least 90% identity to SEQ ID NO:2.

7. (previously presented) A method of claim 1 wherein the sequence-non-specific double-stranded nucleic-acid-binding domain comprises the amino acid sequence of SEQ ID NO:2.

8. (currently amended) A method of amplifying a subsequence of a target nucleic acid in an aqueous solution using a polymerase chain reaction, the method comprising:  
contacting the target nucleic acid with a polymerase comprising a sequence-non-specific double-stranded nucleic-acid-binding domain that comprises an amino acid sequence that has at least 75% identity to the amino acid sequence of SEQ ID NO:2 joined to a polymerase domain with error-correcting activity, where the sequence non-specific nucleic-acid-binding domain enhances the processivity of the polymerase domain compared to an identical polymerase domain not having the sequence non-specific double-stranded nucleic acid binding domain; and, and

wherein the solution comprises  $10^5$  or fewer copies/ml of the target nucleic acid and is of a composition that permits the sequence non-specific double-stranded nucleic acid binding domain to bind to the target nucleic acid and the polymerase domain to extend a primer that is hybridized to the target nucleic acid sequence;

(ii) incubating the solution using a polymerase chain reaction temperature profile that amplifies the subsequence.

9. (previously presented) A method of claim 8 wherein the polymerase domain has thermally stable polymerase activity.
10. (previously presented) A method of claim 8 wherein the polymerase domain comprises a *Pyrococcus* polymerase domain.
11. (cancelled)
12. (previously presented) A method of claim 8 wherein the sequence-non-specific double-stranded nucleic-acid-binding domain has at least 85% identity to SEQ ID NO:2.
13. (previously presented) A method of claim 8 wherein the sequence-non-specific double-stranded nucleic-acid-binding domain has at least 90% identity to SEQ ID NO:2.
14. (previously presented) A method of claim 8, wherein the sequence-non-specific double-stranded nucleic-acid-binding domain comprises the amino acid sequence of SEQ ID NO:2.
15. (previously presented) A method of amplifying a target nucleic acid in an aqueous solution, the method comprising:
- (i) contacting the target nucleic acid with a polymerase comprising a sequence non-specific double-stranded nucleic acid binding domain joined to a polymerase domain, wherein the sequence non-specific double-stranded nucleic acid binding domain comprises an amino acid sequence that has at least 75% identity to the amino acid sequence of SEQ ID NO:2, where the presence of the sequence non-specific double-stranded nucleic acid binding domain enhances the processivity of the polymerase domain compared to an identical polymerase domain not having the sequence non-specific double-stranded nucleic acid binding domain; and

wherein the solution is of a composition that permits the sequence non-specific double-stranded nucleic acid binding domain to bind to the target nucleic acid and the polymerase domain to extend a primer that is hybridized to the target nucleic acid sequence;

(ii) incubating the solution such that the primer is extended, thereby amplifying the target nucleic acid.

16. (currently amended) A method of claim 15, wherein the sequence-non-specific double-stranded nucleic-acid-binding domain has at least 85% identity to SEQ ID NO:2.

17. (previously presented) A method of claim 15, wherein the sequence-non-specific double-stranded nucleic-acid-binding domain has at least 90% identity to SEQ ID NO:2.

18. (previously presented) A method of claim 15, wherein the sequence-non-specific double-stranded nucleic-acid-binding domain comprises the amino acid sequence of SEQ ID NO:2.

19. (currently amended) A method of claim 15, wherein the polymerase domain comprises a family A polymerase domain.

20. (previously presented) A method of claim 15, wherein the polymerase domain comprises a family B polymerase domain.

21. (previously presented) A method of claim 15, wherein the polymerase domain is thermostable.

22. (previously presented) A method of claim 15, wherein the polymerase domain is a *Thermus* polymerase domain or a *Pyrococcus* polymerase domain.

23. (previously presented) A method of claim 15, wherein the sequence non-specific double-stranded nucleic acid binding domain comprises an amino acid sequence that has at least 75% sequence identity to the Sac7d sequence set forth in amino acids 7-71 of SEQ ID NO:10.

24. (previously presented) A method of claim 21, wherein the sequence non-specific double-stranded nucleic acid binding domain comprises an amino acid sequence that has at least 85% sequence identity to the Sac7d sequence set forth in amino acids 7-71 of SEQ ID NO:10.

25. (currently amended) A method of claim 22, wherein the sequence non-specific double-stranded nucleic acid binding domain comprises an amino acid sequence that has at least 90% sequence identity to the Sac7d sequence set forth in amino acids 7-71 of SEQ ID NO:10.

26. (previously presented) A method of claim 15, wherein the sequence non-specific nucleic-acid-binding domain is Sac7d.